3rd Thematic IASC Conference on Knowledge Commons: 'Advancing Knowledge Commons through Legal and Social Changes' - When commons meet law and public policy

The Relevance of the Knowledge Commons within Sustainable Development Goals

Authors: *Jessica Kummer, Gabriel Abu-Tayeh, Thomas Myrach, Matthias Stuermer*

Keywords: *Sustainable Development Goals, Digital Sustainability, Knowledge Commons, Digital Commons*

Abstract:

The paper analyzes, from the perspective of information systems research, whether or not Knowledge Commons contribute to the Sustainable Development Goals. This is of interest as Knowledge Commons have several advantages compared to other institutional arrangements: Most importantly, the unrestricted access to knowledge allows ease of use. Other advantages include its contextual relevance due to higher density of knowledge relevant for specific local areas and the complementarity of Knowledge Commons with each other, which further leverages the effects. We found that a huge proportion (around three quarters) supports the Sustainable Development Goals and therefore support the international public policy of the United Nations and its 193 member states. The study strengthens the argument of the importance of Knowledge Commons within public policy as an enabler to leverage positive impacts, from an organizational to a structural level.

Introduction:

Knowledge Commons do not restrict access to data, information and knowledge through organizational boundaries, technical restrictions or intellectual copyrights (Frischmann et al., 2014). Therefore, the barrier to the use of such knowledge is much lower than in the use of proprietary knowledge. Access to knowledge empowers people and may help to reduce inequality, for instance by reducing the digital divide (Van Dijk, 2006). The digital divide refers to economic and social inequality with regard to the access and use of knowledge within the information society.

However, the simple reduction of Knowledge Commons to empowering people to reduce inequality fails to explain the breadth of relevance of Knowledge Commons within public policy. For this reason, this paper intends to elaborate *how Knowledge Commons support global political goals.* We therefore select Knowledge Commons from a Commons-Based Peer Production database (P2P Value Network) and map them in relation to the Sustainable Development Goals. The Sustainable Development Goals represent the global agenda for the next 15 years and were adopted by the United Nations and its 193 member states. We find that the largest share (around three quarters) are of direct benefit to the Sustainable Development Goals (SDGs). Mapping the Knowledge Commons on the SDGs led us to two additional findings: (1) Knowledge Commons are often better organized regionally and are therefore very effective at realizing global goals on a local level. (2) Knowledge Commons are often complementary to each other, which helps to leverage their overall contribution.

Perspective of Information Systems Research:

Knowledge Commons can be seen as a special case of information systems. "An information system is a consistent, coordinated set of components acting together toward the production, distribution, processing of information" (Ratzan, 2004, p. 1). Information Systems are socio-technical systems, in which people, tasks and technical elements are the coordinated components. Furthermore, "Knowledge Commons are defined as the institutionalized community governance of the sharing and, in some cases,

creation, of information, science, knowledge, data, and other types of intellectual and cultural resources." (Frischmann et al., 2014, p. 5).

Information Systems Research differentiates between "Sustainability in ICT (Information and Communication Technology)" and "Sustainability by ICT" (Kossahl et al., 2012). Sustainability in ICT is defined as: *"Making ICT goods and services more sustainable over their whole life cycle, mainly by reducing the energy and material flows they invoke"* and Sustainability by ICT: *"Creating, enabling, and encouraging sustainable patterns of production and consumption by means of ICT."* (Hilty and Aebischer, 2015, p. 18). This paper does not examine whether Knowledge Commons rely more on reduced-energy consumption technology ("Sustainability in ICT") than institutionalized communities not sharing intellectual and cultural resources. A study observing "Sustainability in ICT" would require in-depth interviews and field observations.

To enable the effects of "Sustainability by ICT", information systems have to be created, implemented and used. Within the Use-Dimension, Knowledge Commons are of particular interest since the use of knowledge is not restricted by organizational boundaries or intellectual property (Frischmann et al., 2014). The restriction of access to knowledge has an important disadvantage: In Information Systems Research, the effects of information systems on sustainable development are differentiated on three levels: (1) "Life-Cycle Impacts" which are mainly negative impacts attributable to the existence of information systems. (2) "Enabling Impacts" whereby information systems optimize the design, the production, the use, the end-of-life treatment of other products or even modify other products by substitution (decreasing demand) or induction (increasing demand). (3) Structural Impacts, meaning structural changes on institutional/societal level due to the use of information systems. If knowledge is restricted by an organization, the potential for evolution from an "Enabling Impact" to a "Structural Impact" is limited because fewer organizations or individuals are able to benefit from the specific knowledge concerned. Therefore, Knowledge Commons as a subcategory of information systems would be beneficial for the evolvement to level three if Knowledge Commons do indeed contribute as an "Enabling Impact". Since Knowledge Commons by their very definition fulfill the sharing of information for use by other institutions and individuals, this is not sufficient to prove any overall contribution to sustainable development. Therefore, we explore *whether Knowledge Commons contribute to the Sustainable Development Goals and therefore support global political goals within public policy*.

Methodology:

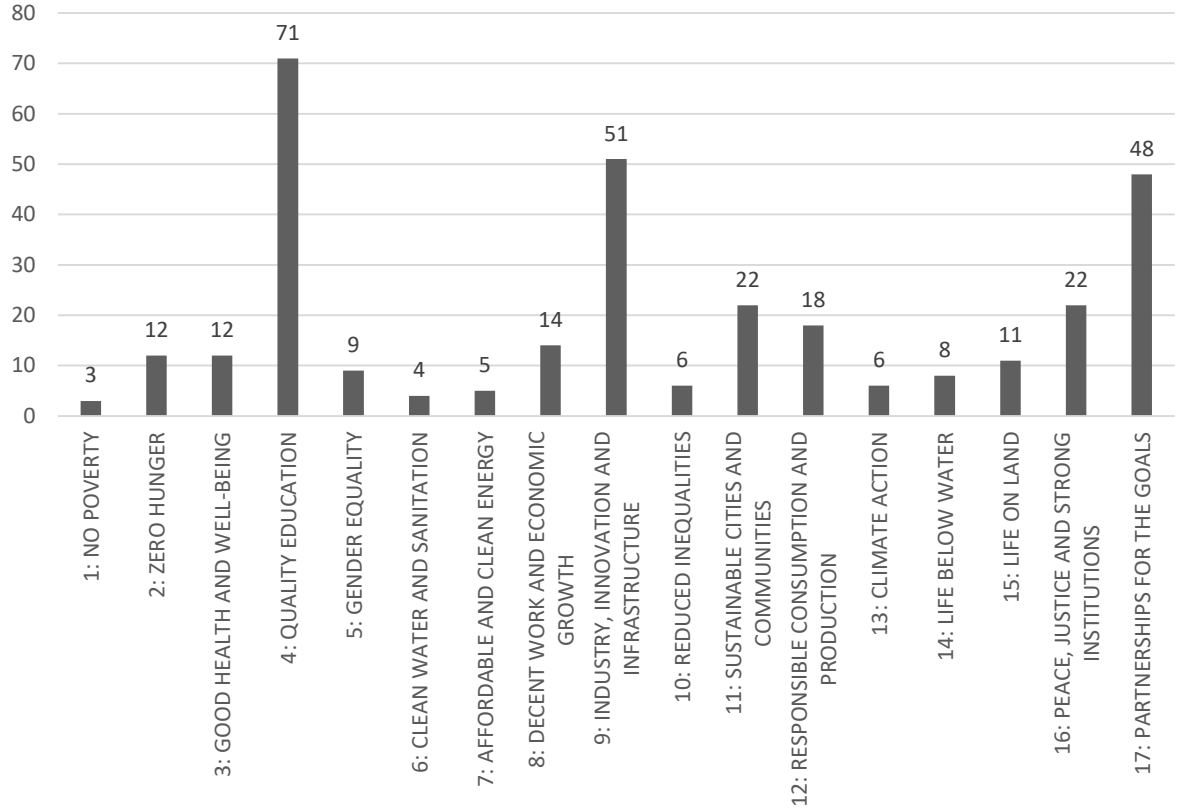
We analyze Knowledge Commons in terms of their contribution to the public policy of the Sustainable Development Goals (SDG) for 2016 – 2030 recently published by the United Nations (United Nations, 2015). The 193 member states approved all of the Sustainable Development Goals. The World Bank recently published a policy note that illustrates how open data can help to address the SDGs (Gurin and Manley, 2015). For each SDG, one to four Open Data solutions were mapped which contribute to the achievement of the SDGs. We enhance this conceptual work by mapping real cases to each of the SDGs. To do so, we analyze the 380 available commons-based peer production cases on the P2P Value Directory in terms of whether or not they can be considered to constitute Knowledge Commons (P2P Value Directory, 2016). The evaluation of whether or not the cases are Knowledge Commons was conducted using the aforementioned definition of Knowledge Commons by Frischmann et al. (2014). In a second step, we map each of the remaining cases to one of the SDGs and display the results in a table. We allowed multiple mapping, which means that one Knowledge Common could be assigned to several SDGs.

(Figure 1 here)

Results:

211 of the 380 cases on the P2P Value Directory could be considered to be Knowledge Commons. Of these 211 cases, 157 cases could be directly assigned to one of the Sustainable Development Goals. Every Sustainable Development Goal was covered by at least three Knowledge Commons. The most

Knowledge Commons were assigned to SDG number 4, "Quality Education" (71), followed by SDG number 9 "Industry Innovation and Infrastructure" (51) and SDG number 17 "Partnerships for the goals" (48). The least mappings were allocated to SDG number 1 "No Poverty" (3), followed by "Clean Water and Sanitation" (4) and "Affordable and Clean Energy" (7). The following visualizations summarize the findings:



Discussion:

Reasons for high frequency of goal 4, 9 and 17

Every Sustainable development goal was mentioned in some capacity, though some goals were considered more often. Sustainable Development Goal 4 is to some extent part of the definition of a knowledge common. Sharing and creating knowledge was a central issue. Hence, SDG 4 was a leading subject. Furthermore, SDG 9 and 17 were subject to many Knowledge Commons. SDG 9 underlines the importance of resilient infrastructure and fosters innovation. Innovation in particular was a key topic. Several communities set themselves the aim of making cities better through technology and participation. Populs is an example of a Knowledge Common that aims to share knowledge and technology that supports citizens. Populs brings people together to create civic software. Hence, its mission follows SDG 9 and 17. Others like SDG 1, 6, or 13 were mentioned in some rare cases. Poverty and climate change seem to be subordinate to infrastructure and sustainable innovation. Cooperativa Integral Catalana is an example that contributes to human well-being and the reduction of poverty.
SDG 9 emphasizes the importance of a resilient infrastructure and innovation promotion. Several communities set themselves the aim of making cities better through technology and participation. To establish a community with different personalities, it is essential to have a sustainable infrastructure to reach people worldwide. The Common House can be assigned to SDG 9. The community is a collective attempt to organize and maintain infrastructure.
SDG 17 "Partnership for the goals" was covered more often than the other targets. Knowledge Commons were especially focused on the sub-goals 17.6 to 17.8 "Technology" and the sub-goal 17.16 "Multi-stakeholder partnerships". SDG 17.6 and 17.7 focus on access to science and technology to promote the development and diffusion of technologies. SDG 17.8 is about the enhancement of the use of information and communications technology. Many Communities can be seen as networks that hope to

promote development in Science and Technology through knowledge exchange and mutual learning. Part of the definition of a Knowledge Commons is to build a community and to share knowledge. This leads to the explanation of why SDG 17 was assigned more often. Knowledge Commons share knowledge to gain new insights, to make progress and to attain innovation. That is why SDG 17 was assigned more often. Open Economy Log, for instance, is a community that focuses on the efficient utilization of resources. It aims to support the local economy by showing how to use resources in a sustainable manner. Another example is wlan slovenija. Wlan slovenija is a wireless network community. The community uses common and widespread wireless technology to provide access to information technology for as many people as possible.

Reasons for low frequency of goals

SDG 1, with the aim of ending poverty, was mentioned only a few times. This could be because Knowledge Commons are focused on creating a new network and concentrate on goals that help to reach different people and companies. Many Knowledge Commons focus on goals that foster innovation in different fields of science. SDG 6, SDG7, SDG 10 and SDG 13 were also rarely pursued. This is because Knowledge Commons are not yet focused on specific innovations in sustainable energy or sustainable management of water.
Reducing inequality between countries (SDG 10) and achieving gender equality (SDG 5) was for the most part not an explicit objective. It may, however, be that these goals are pursued indirectly, for example by recruiting new members worldwide and by giving everyone the change to speak up. An exception is Generatech. Generatech is a platform with the specific objective of supporting gender equality and the empowerment of women.
There were only a few Knowledge Commons assigned to SDG 7 "Affordable and Clean Energy". One of the exceptions is Energypedia: this community creates and shares knowledge on the production and design of renewable energies and sustainable energy sources. Another example is Som Energia Platform. The social movement commercializes renewable electricity for Spanish homes and shares knowledge to build pressure for change in the electricity market.

Side findings

By mapping the Knowledge Commons on the SDGs, we made two additional findings: (1) Local contributions: The Sustainable Development Goals require the member states to contribute to the goals. For example, the Swiss government states that: "*The SDGs are to be achieved around the world, and by all UN member states, by 2030. This means that all states are called upon equally to play their part in finding shared solutions to the world's urgent challenges."*(Federal Department of Foreign Affairs, 2016). While the Knowledge Commons are often regionally organized, or at least with more activity within one geographical area, they are able to contribute on a contextual level, where no centralized organization would be able to gather such specific information. For example, the collaborative map provider Open Street Map in some areas has far more specifications than proprietary providers. Therefore, during natural disasters, Open Street Map can sometimes be of greater relevance than proprietary providers, since the information is more readily adaptable and more precise (as seen during earthquake in Haiti) (Chapman, 2015). (2) Complementary: communities can be complementary to each other. When considering SDG 4, there are various communities that want to ensure education for all. Hence, to achieve universal access to education, the government can act as an intermediary between communities. One example is a community named Wikiversity, which provides the creation of free and open educational resources. Archive.org is another community that can be compared to a digital library. The aim of archive.org is to provide free access to information for researchers, scholars and the general public. Internet access is needed to use Wikiversity or Archive.org. OLPC (One Laptop Per Child) helps children to learn and engage in their own education by providing them a laptop. OLPC designs a low-cost and connected laptop to empower poor children through education. Hence, one way to provide access to Wikiversity or Archive.org is OLPC.

Value for Knowledge Commons Research:

First of all, the paper provides an understanding of the importance of ease of access to knowledge in terms of enabling positive effects on a structural level rather than on an organizational level. If knowledge is not restricted, the transformation from "Enabling Impacts" to "Structural Impacts" is simplified. Second, the mapping of the Knowledge Commons on the SDGs emphasizes the fact that Knowledge Commons comprise advantages in meeting the SDGs. Third, it strengthens the argument that Knowledge Commons are especially strong in supporting public policies on a regional level. This is in line with the quote from Elinor Ostrom on receiving a Nobel prize for her work with commons: "Bureaucrats sometimes do not have the correct information, while citizens and users of resources do" (Ostrom, 2009). Fourth, with examples for each of the 17 SDGs, we provide a basis for subsequent case studies by researchers of Knowledge Commons to evaluate the contributions made by Knowledge Commons to the global agenda of sustainable development.

Limitations:

Our approach has two main limitations: First, we conducted our mapping based on findings on the Internet, mainly on the website provided by the commoners. This leads to limitations as we collected only information based on information available online and, second, we do not know whether the Knowledge Commons actually fulfill their promised contribution to society. As such, it is questionable whether the research would have been more accurate had we conducted the research among Digital Commons rather than Knowledge Commons. Digital Commons are "information and knowledge resources that are collectively created and owned or shared between or among a community and that tend to be non-exclusivedible, that is, be (generally freely) available to third parties. Thus, they are oriented to favor use and reuse, rather than to exchange as a commodity. Additionally, the community of people building them can intervene in the governing of their interaction processes and of their shared resources." (Fuster Morell, 2010). Second, the selection of cases from the P2P Value Directory may be not a representative sample as the primary aim of the Directory is to collect Commons-based Peer Production Cases, rather than Knowledge Commons.

References:

Chapman, K., 2015. Commoning in Times of Disaster: The Humanitarian OpenStreetMap Team, in: Bollier, D., Helfrich, S. (Eds.), Patterns of Commoning. Commons Strategy Group and Off the Common Press.

Federal Department of Foreign Affairs, 2016. 17 Sustainable Development Goals [WWW Document]. The Federal Administration. URL https://www.eda.admin.ch/post2015/en/home/agenda-2030/die-17-ziele-fuer-eine-nachhaltige-entwicklung.html (accessed 10.19.16).

Frischmann, B.M., Madison, M.J., Strandburg, K.J., 2014. Governing Knowledge Commons. Oxford University Press on Demand.

Fuster Morell, M., 2010. Governance of online creation communities: Provision of infrastructure for the building of digital commons.

Gurin, J., Manley, L., 2015. Open Data for Sustainable Development (No. Policy Note ICT01). World Bank.

Hilty, L.M., Aebischer, B., 2015. ICT for Sustainability: An Emerging Research Field, in: Hilty, L.M., Aebischer, B. (Eds.), ICT Innovations for Sustainability. Springer International Publishing, Cham, pp. 3–36.

Kossahl, J., Busse, S., Kolbe, L.M., 2012. The Evolvement of Energy Informatics in the Information Systems Community-a literature Analysis and Research Agenda., in: ECIS. p. 172.

P2P Value Directory, 2016. Access the data | Commons-Based Peer Production directory [WWW Document]. URL http://directory.p2pvalue.eu/download (accessed 4.13.16).

Ratzan, L., 2004. Understanding Information Systems: What They Do and why We Need Them. American Library Association.
United Nations, 2015. Sustainable Development Goals [WWW Document]. URL https://sustainabledevelopment.un.org/sdgs (accessed 10.23.15).
Van Dijk, J.A., 2006. Digital divide research, achievements and shortcomings. Poetics 34, 221–235.

Appendix

Figure 1